

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 6,940,988 B1
DATED : September 6, 2005
INVENTOR(S) : Shennib et al.

Page 1 of 8

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 18.

Line 55, delete entire claims and replace with the following:

1. **A semi-permanent hearing device configured to be inserted entirely within a wearer's ear canal past the canal aperture for long-term use therein, the device comprising:**
 - a sealing retainer configured to be seated in a bony portion of the ear canal along the longitudinal axis and in direct contact with walls of the ear canal when the device is fully inserted within the canal, the sealing retainer being conformable to the shape of the canal;**
 - a receiver assembly configured to mate with the sealing retainer for positioning in a bony portion of the canal, the receiver assembly including a receiver for supplying acoustic signals processed by the device to a tympanic membrane of the wearer;**
 - a microphone assembly including a microphone configured to receive incoming acoustic signals for processing by the device, the microphone assembly sized to be substantially non-occluding of a cartilaginous portion of the canal;**
 - a flexible connector flexibly coupling the receiver assembly and the microphone assembly, the connector configured to flexibly support the microphone assembly in the cartilaginous portion of the canal so as to have minimal contact with the canal walls and allow freedom of movement of the microphone assembly across a cross section of the ear canal in response to an applied force; and**
 - a battery assembly coupled to at least one of the flexible connector, the receiver assembly and the microphone assembly, the battery assembly including a battery for powering the device.**
2. **The semi-permanent hearing device of claim 1, wherein the battery assembly includes a thin enclosure substantially conforming to the shape of the battery, the enclosure encapsulating and supporting the battery therein.**
3. **The semi-permanent hearing device of claim 1, wherein the sealing retainer is sufficiently soft and yielding to conform itself to the shape of the ear canal in the bony portion for long-term retention in a seated position therein when the device is fully inserted into the ear canal.**

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Column 18 (cont'd).

3. The semi-permanent hearing device of claim 1, wherein the sealing retainer is sufficiently soft and yielding to conform itself to the shape of the ear canal in the bony portion for long-term retention in a seated position therein when the device is fully inserted into the ear canal.
4. The semi-permanent hearing device of claim 1, wherein the sealing retainer includes a cavity to accept the receiver assembly in mating relationship therewith.
5. The semi-permanent hearing device of claim 2, wherein each of the receiver assembly and the microphone assembly includes a respective thin enclosure encapsulating the receiver and the microphone respectively, whereby, together with the thin enclosure of the battery assembly, to inhibit contamination and damage of the device.
6. The semi-permanent hearing device of claim 5, wherein each of the thin enclosures is moisture-proof.
7. The semi-permanent hearing device of claim 5, wherein each of the thin enclosures has a wall thickness not exceeding 0.3 mm.
8. The semi-permanent hearing device of claim 1, wherein each of the receiver and the microphone has a port for passage of the respective acoustic signal therethrough, and further including at least one debris guard for mating with at least one of the microphone and the receiver without substantial interference with passage of the acoustic signal through the respective port.
9. The semi-permanent hearing device of claim 8, wherein the at least one debris guard is moisture proof.
10. The semi-permanent hearing device of claim 8, wherein the at least one debris guard is substantially acoustically transparent.
11. The semi-permanent hearing device of claim 8, wherein the at least one debris guard comprises a replaceable cap.

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Column 18 (cont'd).

12. The semi-permanent hearing device of claim 11, wherein the replaceable cap comprises a body member and guard member.
13. The semi-permanent hearing device of claim 8, wherein the at least one debris guard comprises an adhesive pad incorporating an adhesive.
14. The semi-permanent hearing device of claim 8, wherein the at least one debris guard is removable and disposable for replacement thereof.
15. The semi-permanent hearing device of claim 1, wherein the support of the microphone assembly via the connector is sufficiently flexible to enable movement of the microphone assembly in response to forces from sources including physiologic debris collected in the ear canal and canal deformations associated with movements of the ear canal.
16. The semi-permanent hearing device of claim 1, wherein the receiver assembly includes an air vent.
17. The semi-permanent hearing device of claim 1, wherein the sealing retainer includes an air vent.
18. The semi-permanent hearing device of claim 1, further including a reed-switch assembly coupled to the device for magnetically-induced remote power switching or control of the device.
19. The semi-permanent hearing device of claim 18, wherein the reed-switch assembly includes a miniature latching magnet to enable latching of the reed-switch assembly.
20. The semi-permanent hearing device of claim 1, further including means associated with the device for remote power switching or control of the device.

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Column 18 (cont'd).

21. The semi-permanent hearing device of claim 20, wherein the means for remote power switching or control of the device comprises an external control magnet sized to be hand-held.

22. The semi-permanent hearing device of claim 21, wherein the external control magnet is bar-shaped.

23. The semi-permanent hearing device of claim 1, wherein the microphone assembly includes amplifier means integral therewith for processing the incoming signal.

24. The semi-permanent hearing device of claim 1, wherein the flexible connector comprises a thin film circuit.

25. The semi-permanent hearing device of claim 24, wherein the thin film circuit comprises a main section associated with the battery assembly, a medial section associated with the receiver assembly, and a lateral section associated with the microphone assembly.

26. The semi-permanent hearing device of claim 25, wherein the medial and lateral sections are bendable with respect to the main section.

27. The semi-permanent hearing device of claim 1, wherein the flexible connector includes electrically conductive pads for connection to terminals of the battery.

28. The semi-permanent hearing device of claim 1, wherein the flexible connector includes a crossing section for connection to a crossing terminal of the battery.

29. The semi-permanent hearing device of claim 1, further including manually adjustable control means for adjusting at least one electro acoustic parameter of the device.

30. The semi-permanent hearing device of claim 29, wherein the manually adjustable control means includes at least one electrical jumper for enabling the adjustment.

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Column 18 (cont'd).

31. The semi-permanent hearing device of claim 1, including programming means for selectively adjusting electro acoustic parameters of the device.
32. The semi-permanent hearing device of claim 31, wherein the programming means includes a programmer external to the device and adjustment means internal to the device responsive to programming signals from the programmer for performing the selective adjustment.
33. The semi-permanent hearing device of claim 32, wherein the programmer includes an electrical cable for connection to the device for delivering the programming signals to the internal adjustment means.
34. The semi-permanent hearing device of claim 32, wherein the programmer and the internal adjustment means include means for remote programming of the device by delivery of the programming signals without a physical connection there between.
35. The semi-permanent hearing device of claim 34, wherein the remote programming means includes means for transmitting and receiving at least one of sound, ultrasound, magnetic, electromagnetic, radio frequency and infrared signals as the programming signals.
36. The semi-permanent hearing device of claim 1, including measuring means for performing in-situ probe tube measurements of parameters of the device.
37. The semi-permanent hearing device of claim 1, wherein at least a portion of the sealing retainer comprises polyurethane, polyurethane foam or silicone.
38. The semi-permanent hearing device of claim 1, wherein the sealing retainer is removable or removable and disposable for replacement thereof.
39. The semi-permanent hearing device of claim 4, wherein the cavity is positioned in the sealing retainer coaxially with an axis to substantially coincide with the longitudinal axis of the ear canal in the bony portion thereof when the device is fully inserted

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into the ear canal, whereby to support the receiver assembly along the longitudinal axis in the vicinity of the tympanic membrane of the wearer.

40. The semi-permanent hearing device of claim 4, wherein the cavity is medially shaped to conform at least partially to the battery assembly for acceptance thereof.

41. The semi-permanent hearing device of claim 1, wherein the sealing retainer is configured to provide sufficient acoustic sealing within the bony portion of the ear canal to substantially prevent the acoustic signals emanating from the receiver from feeding back to the microphone.

42. The semi-permanent hearing device of claim 1, wherein the sealing retainer is selectable from among an assortment of sealing retainers of different sizes and shapes supplied with the hearing device to accommodate the dimensions of the ear canal of the individual wearer.

43. The semi-permanent hearing device of claim 1, wherein the battery is a button cell type battery.

44. The semi-permanent hearing device of claim 2, wherein the battery is removable from the thin enclosure.

45. The semi-permanent hearing device of claim 2, wherein the battery assembly is removable from the device

46. The semi-permanent hearing device of claim 1, wherein the receiver assembly protrudes medially beyond the sealing retainer.

47. The semi-permanent hearing device of claim 1, wherein the connector has a varying flexibility along a length of the connector.

48. A semi-permanent hearing device configured to be inserted entirely within a wearer's ear canal past the canal aperture for long-term use therein, the device comprising:

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a sealing retainer configured to be seated in a bony portion of the ear canal along the longitudinal axis and in direct contact with walls of the ear canal when the device is fully inserted within the canal, the sealing retainer being conformable to the shape of the canal;

a receiver assembly configured to mate with the sealing retainer for positioning in a bony portion of the canal, the receiver assembly including a receiver for supplying acoustic signals processed by the device to a tympanic membrane of the wearer;

a microphone assembly including a microphone configured to receive incoming acoustic signals for processing by the device, the microphone assembly sized to be substantially non-occluding of a cartilaginous portion of the canal;

a flexible connector flexibly coupling the receiver assembly and the microphone assembly, the connector configured to flexibly support the microphone assembly in the cartilaginous portion of the canal so as to have a void space between a substantial portion of a microphone assembly perimeter and the walls of the cartilaginous portion; and

a battery assembly coupled to at least one of the flexible connector, the receiver assembly and the microphone assembly, the battery assembly including a battery for powering the device.

49. A semi-permanent hearing device configured to be inserted entirely within a wearer's ear canal past the canal aperture for long-term use therein, the device comprising:

a sealing retainer configured to be seated in a bony portion of the ear canal along the longitudinal axis and in direct contact with walls of the ear canal when the device is fully inserted within the canal, the sealing retainer being conformable to the shape of the canal;

a receiver assembly configured to mate with the sealing retainer for positioning in a bony portion of the canal, the receiver assembly including a receiver for supplying acoustic signals processed by the device to a tympanic membrane of the wearer;

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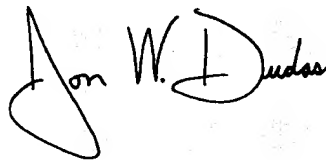
a microphone assembly including a microphone configured to receive incoming acoustic signals for processing by the device, the microphone assembly sized to be substantially non-occluding of a cartilaginous portion of the canal;

a flexible connector flexibly coupling the receiver assembly and the microphone assembly, the connector configured to flexibly support the microphone assembly in the cartilaginous portion of the canal and allow freedom of movement of the microphone assembly across a cross section of the ear canal in response to an applied force, the connector having a varying flexibility across a portion of the connector; and

a battery assembly coupled to at least one of the flexible connector, the receiver assembly and the microphone assembly, the battery assembly including a battery for powering the device.

Signed and Sealed this

Twenty-eighth Day of March, 2006

A handwritten signature in black ink, appearing to read "Jon W. Dudas". The signature is stylized with a large, looped initial "J" and a cursive "Dudas".

JON W. DUDAS
Director of the United States Patent and Trademark Office